

Having thus described the preferred embodiments, the invention is now claimed to be:

1. A brake actuator for actuating a brake to decelerate a vehicle, the brake actuator comprising:

a housing defining a cavity;

an integral modulator;

5 an input passage communicating with a source of pressurized air and the modulator; and

an outlet passage communicating with the cavity and the modulator, the pressurized air passing from the input passage to the cavity via the modulator and the outlet passage, and the modulator modulating the pressurized air passed to the cavity.

2. The brake actuator as set forth in claim 1, wherein the modulator includes:  
a solenoid that operates in a plurality of modes.

3. The brake actuator as set forth in claim 1, wherein the modulator includes:  
a supply diaphragm between the input passage and the outlet passage; and  
an exhaust diaphragm between the outlet passage and an exhaust passage, the supply and exhaust diaphragms cooperating to modulate the pressurized air passed to the cavity.

4. The brake actuator as set forth in claim 3, wherein the modulator includes:  
a first valve, associated with the supply diaphragm, movable to a plurality of positions, the modulator operating in respective ones of a plurality of modes as a function of the position of the first valve, the pressurized air being passed from the input passage to the outlet passage while the modulator is operating in a first one of the modes.

5. The brake actuator as set forth in claim 4, wherein the modulator includes:  
a second valve, associated with the exhaust diaphragm, movable to a plurality of positions, the modulator operating in the respective ones of the plurality of modes as a function of the respective positions of the first and second valves.

6. The brake actuator as set forth in claim 5, further including:  
a first solenoid for selectively moving the first valve to the plurality of positions.

7. The brake actuator as set forth in claim 6, further including:  
a second solenoid for selectively moving the second valve to the plurality of positions.

8. The brake actuator as set forth in claim 5, wherein the modulator includes:  
an exhaust passage communicating with a face of the exhaust diaphragm, the pressurized air being passed from the outlet passage to the exhaust passage while the modulator is operating in a second one of the modes.

9. The brake actuator as set forth in claim 5, further including:  
a speed sensor associated with a wheel of the vehicle;  
a comparator for determining a comparison of a speed of the vehicle to a speed of the wheel; and  
5 a modulation controller for controlling the first and second solenoids as a function of the comparison.

10. A brake actuator for a vehicle, the brake actuator comprising:  
a housing defining a cavity;  
an input passage communicating with a source of pressurized air;  
an outlet passage communicating with the cavity; and  
5 means for modulating the pressurized air received via the input passage and communicated to the cavity via the outlet passage.

11. The brake actuator as set forth in claim 10, wherein the means for modulating is included in the housing.

12. The brake actuator as set forth in claim 10, wherein the means for modulating includes:

a supply diaphragm for controlling a flow of the pressurized air between the input passage and the outlet passage;

5 a first pusher member, associated with the supply diaphragm, movable to a plurality of positions; and

a first solenoid for controlling the position of the first pusher member, the pressurized air being passed from the input passage to the outlet passage when the first pusher member is in a first of the positions.

13. The brake actuator as set forth in claim 12, wherein the means for modulating further includes:

an exhaust diaphragm for controlling a flow of the pressurized air between the outlet passage and an exhaust passage, the supply and exhaust diaphragms cooperating to modulate  
5 the pressurized air passed to the cavity;

a second pusher member, associated with the exhaust diaphragm, movable to a plurality of positions; and

a second solenoid for controlling the position of the second pusher member, the pressurized air being passed from the outlet passage to the exhaust passage when the second  
10 pusher member is in a first of the positions.

14. The brake actuator as set forth in claim 13, further including:

a control terminal for receiving antilock braking signals selectively causing the first and second pusher members to move between the plurality of positions.

15. The brake actuator as set forth in claim 13, wherein the supply and exhaust diaphragms cooperate to modulate the pressurized air passed to the cavity.

16. A method for actuating a brake to decelerate a vehicle, the method comprising:

receiving a compressed fluid into an input passage of a brake actuator;

selectively modulating the compressed fluid via a modulator integral with the brake

5 actuator; and

passing the modulated compressed fluid to a cavity of the actuator via a modulator outlet passage.

17. The method for actuating a brake to decelerate a vehicle as set forth in claim 16, further including:

moving a first valve, which is associated with a supply diaphragm between the input passage and the outlet passage, between a plurality of positions, the modulator operating in  
5 respective modes as a function of the position of the first valve; and

if the modulator is in a first of the modes, passing the compressed fluid from the input passage to the outlet passage.

18. The method for actuating a brake to decelerate a vehicle as set forth in claim 17, further including:

moving a second valve, which is associated with an exhaust diaphragm, between a plurality of positions, the modulator operating in one of the modes as a function of the  
5 positions of the first and second valves.

19. The method for actuating a brake to decelerate a vehicle as set forth in claim 18, further including:

transmitting a first control signal to a first solenoid for controlling the first valve; and  
transmitting a second control signal to a second solenoid for controlling the second  
5 valve.

20. The method for actuating a brake to decelerate a vehicle as set forth in claim 19, wherein the transmitting steps include:

determining whether antilock braking signals are received at a control terminal; and  
transmitting the control signals to the first and second solenoids as a function of  
5 whether the antilock braking signals are received at a control terminal.